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EXAMINER

CREPEAU, JONATHAN

ART UNIT PAPER NUMBER

1746

DATE MAILED: 08/01/2003

10

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/816,628

Applicant(s)

JENSON ET AL.

Examiner

Jonathan S. Crepeau

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 7-14, 27-34, 54 and 55 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 56-67 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 15-23, 25, 26 and 35-53 is/are rejected.
- 7) ☒ Claim(s) 4, 6 and 24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2, 4, 7-9.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. Each of the references cited in the IDS filed on May 14, 2003 (paper no. 7) has also been cited in the IDS filed on June 3, 2003 (paper no. 8). Therefore, the citations in the IDS of May 14 have been crossed out since they are duplicates of the citations of the IDS of June 3.

### ***Election/Restrictions***

2. Applicant's election without traverse of specie i, the photovoltaic cell, in paper no. 6 is acknowledged. Claims 7-14, 27-34, 54, and 55, which are directed to the species of the capacitor, traces, and vias, are withdrawn from further consideration since they do not depend upon or otherwise include each of the limitations of an allowed generic claim as required by 37 CFR 1.141.

### ***Claim Suggestions***

3. The clarity of claims 22 and 57 could be improved by amending the following limitations in an appropriate manner: in claim 22, lines 2 and 3, the limitation "the first structure" lacks proper antecedent basis; in claim 57, lines 1 and 2, the limitation "the electrically powered device" also lacks proper antecedent basis. Appropriate correction is suggested (but not required).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 5, 17, 18, 20, 21, 25, 37, 38, 40-42, 48, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ezawa et al (U.S. Patent 4,481,265) in view of Kwak et al (U.S. Patent 6,280,875).

Regarding claims 1, 21, and 48, Ezawa et al. is directed to an apparatus comprising a first structure which comprises a substrate (1), a first conductive layer (11) on the substrate, and a battery (20) in electrical contact with the conductive layer (see Fig. 1; col. 2, line 56). The battery comprises an anode and a cathode (13, 14) sandwiching an electrolyte (16) containing lithium (see Fig. 1; col. 3, lines 24-50). Electrical circuit components (conductor pieces 70) are deposited on (i.e., located “adjacent face-to-face to”) the battery (see Fig. 1; col. 5, line 21). Regarding claims 5, 25, and 52, the reference teaches a photovoltaic cell (10) having a major surface adjacent face-to-face to an opposite face surface of the substrate from the battery (see Fig. 1; col. 2, line 33). Regarding claims 17, 18, 37, and 38, the substrate may comprise a steel web (i.e., foil) sandwiched by insulative layers (see col. 2, lines 36-40). Regarding claims 20 and 40, the substrate may comprise glass (see col. 2, line 38).

Ezawa et al. further teach that the cathode and anode may comprise inorganic films in column 4, line 47, but do not expressly teach that at least one of the anode and cathode comprises

an intercalation material, as recited in claims 1, 21, and 48. The reference further does not expressly teach that the battery is formed on the conductive layer in the order of cathode-electrolyte-anode, as recited in claim 41, or that the cathode is annealed, as recited in claim 42.

Kwak et al. is directed to a rechargeable battery structure. The battery comprises a substrate (22), a conductive layer (cathode current collector 26), a cathode (28) deposited on the cathode current collector, an electrolyte (30) deposited on the cathode and cathode current collector, and an anode (34) deposited on the electrolyte (see Fig. 3; col. 4, line 61 et seq.). The cathode comprises an intercalation material such as lithium cobalt oxide, lithium manganese oxide, or lithium nickel oxide, and the anode comprises an intercalation material such as silicon-tin oxynitride (see col. 6, lines 30-67). The cathode is annealed at a temperature of between 550-900°C (see col. 5, lines 50-63).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the battery of Kwak et al. in the device of Ezawa et al. In column 7, line 31, Kwak et al. teach that “[t]he thin-film rechargeable battery 20 and related method are applicable for both low-power and high power battery applications,” and further teach that “this embodiment provides particular advantages for high-power applications.” Thus, an artisan would be motivated to use this battery in the device of Ezawa et al.

Furthermore, the artisan would be motivated to anneal the modified cathode layer of Ezawa et al. In column 5, line 58, Kwak et al. teach that “[f]or high-power applications, annealing the deposited cathode layer is necessary because, at ambient temperature, the cathode

layer is typically amorphous and lacks the crystallinity and the conductance necessary for high-current requirements.” Thus, the artisan would be sufficiently motivated to anneal the modified cathode layer of Ezawa et al.

6. Claims 1-3, 15-19, 21-23, 35-37, 39-42, 44-46, and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lew et al (U.S. Patent 5,644,207) in view of Kwak et al (U.S. Patent 6,280,875).

Regarding claims 1, 21, 44, and 48, Lew et al. is directed to an apparatus comprising a first structure which comprises a substrate (36), a first conductive layer (17) on the substrate, and a battery (12) in electrical contact with the conductive layer (see Fig. 2; col. 4, lines 5-9; col. 4, lines 22-27). The battery comprises an anode and a cathode sandwiching an electrolyte (see col. 3, lines 50-54). Regarding claims 1-3, 21-23, and 48-50, an electrical circuit which comprises a photovoltaic cell is deposited on the battery (see Fig. 2; col. 4, line 8). Regarding claims 2, 22, 44, and 49, the conductive layer (17) comprises an integrated circuit which is operatively coupled to charge the battery using current from the photovoltaic cell (see Fig. 1; col. 4, lines 9 and 10). Regarding claims 15 and 35, the reference further teaches in Figure 13 that the apparatus is flexible and the battery is located on a convex face of the substrate.

Lew et al. do not expressly teach that at least one of the cathode and anode layers comprises an intercalation material, as recited in claims 1, 21, 44, and 48. The reference further

does not expressly teach that the battery is formed on the conductive layer in the order of cathode-electrolyte-anode, as recited in claims 41 and 45, or that the cathode is annealed, as recited in claims 42 and 46. The reference also does not teach that the substrate may comprise metal foil, glass, polymer, or ceramic, as recited in claims 16, 17, 19, 20, 36, 37, 39, and 40. Finally, the reference does not teach that the battery is located on a concave face of the substrate, as recited in claims 15 and 35.

Kwak et al. is directed to a rechargeable battery structure. The battery comprises a substrate (22), a conductive layer (cathode current collector 26), a cathode (28) deposited on the cathode current collector, an electrolyte (30) deposited on the cathode and cathode current collector, and an anode (34) deposited on the electrolyte (see Fig. 3; col. 4, line 61 et seq.). The cathode comprises an intercalation material such as lithium cobalt oxide, lithium manganese oxide, or lithium nickel oxide, and the anode comprises an intercalation material such as silicon-tin oxynitride (see col. 6, lines 30-67). The cathode is annealed at a temperature of between 550-900°C (see col. 5, lines 50-63). The substrate may comprise metal foil, glass, polymer, or ceramic (see col. 8, line 29; col. 5, line 19).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the battery of Kwak et al. in the device of Lew et al. In column 7, line 31, Kwak et al. teach that “[t]he thin-film rechargeable battery 20 and related method are applicable for both low-power and high power battery applications,” and further teach that “this embodiment provides

particular advantages for high-power applications.” Thus, an artisan would be motivated to use this battery in the device of Lew et al.

Furthermore, the artisan would be motivated to anneal the modified cathode layer of Lew et al. In column 5, line 58, Kwak et al. teach that “[f]or high-power applications, annealing the deposited cathode layer is necessary because, at ambient temperature, the cathode layer is typically amorphous and lacks the crystallinity and the conductance necessary for high-current requirements.” Thus, the artisan would be sufficiently motivated to anneal the modified cathode layer of Lew et al.

Regarding the composition of the substrate of Lew et al., Lew et al. teach in column 4, line 22 that “[t]he base material adds an optional foundation for supporting integrated power source 10 and it has, if desired, such optional uses as electrical isolation, electrical grounding, and antenna for the stack when required.” Thus, the substrate of Lew may have a wide variety of functions and compositions. The disclosure of Kwak et al. indicates that metal foil, glass, polymer and ceramic are suitable materials for use as battery substrates. The selection of a known material based on its suitability for its intended use has been held to be *prima facie* obvious (MPEP §2144.07). Thus, the materials recited in claims 16, 17, 19, 20, 36, 37, 39, and 40 would be rendered obvious by the disclosure of Lew et al. Furthermore, regarding claims 16 and 36, the artisan would be motivated to select a polymer as the substrate material that is inexpensive and readily available, such as polyethylene or polypropylene. These materials, and other thermoplastic materials, inherently have a melting point “substantially below 700 degrees centigrade,” as recited in claims 16 and 36.



Further, as noted above, Lew et al. teach that the apparatus is flexible and that the battery is located on a convex face of the substrate. While the reference does not expressly teach that the battery is located on a *concave* face of the substrate, as recited in claims 15 and 35, this would be an obvious modification of the apparatus shown in Figure 13 of Lew et al. The apparatus is flexible and can be formed into a variety of shapes (see col. 8, line 12 et seq.). Accordingly, the apparatus may simply be bent in the opposite configuration as that shown in Figure 13, thereby resulting in the battery being located on a concave face of the substrate. Generally, changes in shape are not considered to patentably distinguish a claim over the prior art (MPEP §2144.04(IV)(B)).

7. Claims 43 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lew et al. in view of Kwak et al. as applied to claims 1-3, 15-19, 21-23, 35-37, 39-42, 44-46, and 48-50 above, and further in view of Kumar (U.S. Patent 6,280,875).

Neither Lew et al. nor Kwak et al. expressly teach the step of annealing the electrolyte layer.

Kumar et al. is directed to a composite electrolyte for a lithium battery. In the abstract, the reference teaches that the electrolyte film is annealed to ensure high conductivity at room temperature.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the

annealed electrolyte of Kumar et al. in the modified battery of Lew et al. In column 1, line 56, Kumar et al. teach that “[t]he film has a high conductivity at room temperature and exhibits good lithium interfacial stability.” Accordingly, the artisan would be motivated to use the annealed electrolyte film of Kumar et al. in the modified battery of Lew et al.

### *Double Patenting*

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 48-53 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-33 of copending Application No. 09/815,884 (U.S. Pre-Grant Publication No. 2002/0037756). Although the conflicting claims are not identical, they are not patentably distinct from each other because instant claim 48 is anticipated by claims 1 and 2 of the ‘884 application. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993). Although the claims of the ‘884 application recite a “recharging circuit” rather than the “integrated circuit operatively coupled to charge the

battery” of instant claim 49, an “integrated” circuit is considered an obvious variation because it is merely a circuit that has its components self-contained. Regarding the configurations of the photovoltaic cells recited in claims 49-53, these configurations are obvious variations of the ‘884 application claims. Claim 21 of the ‘884 application recites that the photovoltaic cell is mounted to the support structure, which clearly suggests the side-by-side configuration of claim 51. Further, regarding the other configurations (e.g., on the battery, on the reverse side of the substrate from the battery, etc.), these configurations are obvious variants of the device defined by claim 10 of the ‘884 claims since they would involve a simple arrangement/rearrangement of parts.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

10. Claims 21-23, 26, 35, 36, and 41 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of copending Application No. 09/816,603 (U.S. Pre-Grant Publication No. 2002/0000034).

Although the conflicting claims are not identical, they are not patentably distinct from each other because the “first layer,” i.e., a cathode current collector, of claims 1 and 6 of the ‘603 application corresponds to the “first conductive layer” of the instant claims. Regarding instant claim 35, forming the substrate into a curved shape having the battery on the concave face would

simply involve the bending of the device of the '603 claims. Thus, this subject matter is an obvious variation of the '603 claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Allowable Subject Matter***

11. Claims 56-67 are allowed.

12. Claims 4, 6, and 24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 26, 51 and 53 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if the above-noted obviousness-type double patenting rejection was overcome.

14. The following is a statement of reasons for the indication of allowable subject matter:

Claims 6, 26, and 53 recite that a photovoltaic cell is “deposited on” (claim 26), is “adjacent to” (claim 53), or is “adjacent face-to-face to” (claim 6) the battery, and that a charging circuit is supported on the photovoltaic cell. These limitations are interpreted as requiring that the photovoltaic cell is located on top of (claims 6, 26), or located on top of or next to (claim 53) the battery, and the charging circuit is located on top of the photovoltaic cell. The closest prior art, Lew et al., teaches a charging circuit (17) located between the battery (12) and the substrate

(36). It would not be an obvious modification to move the charging circuit to a position above the photovoltaic cell (18-20), as this would impede the flow of light to the photovoltaic cell. Accordingly, claims 6, 26, and 53 contain allowable subject matter.

Claims 4, 24, and 51 recite, among other features, that the photovoltaic cell is deposited on a surface of the substrate beside the battery. This is interpreted as requiring that the photovoltaic cell directly touches the substrate. The closest prior art, Lew et al. and Ezawa et al., fails to teach or fairly suggest such a side-by-side configuration of a battery and a photovoltaic cell on a substrate. Accordingly, claims 4, 24, and 51 contain allowable subject matter.

Claims 56 and 62 recite an apparatus comprising a substrate, a battery on the substrate, and an electrical circuit (claim 56) or an electrically powered device (claim 62) deposited on the substrate adjacent the battery. The battery, the circuit, and the device each have a plurality of layers, wherein one of the plurality of layers of the circuit/device and one of the plurality of layers of the battery have substantially identical thicknesses, chemical composition and material characteristics. Neither the claimed circuit nor the claimed device is interpreted herein as encompassing a battery, and the circuit/device must directly touch the substrate. The art of record fails to teach or fairly suggest such a side-by-side configuration of a battery and a circuit/device on a substrate, wherein at least one layer of the battery and at least one layer of the circuit/device have substantially identical characteristics. Accordingly, claims 56 and 62 are allowed.

*Conclusion*

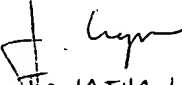
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JSC

July 28, 2003

  
JONATHAN CREPEAU  
PATENT EXAMINER  
ART UNIT 1746